2: value pricing

history and experience

Researching other agencies’ experiences with value pricing projects provides important lessons about project experiences, challenges, issues, and opportunities. The research for this study included collection and review of information on established projects and demonstration projects that are part of the FHWA Value Pricing Pilot Program.

The overall purpose of this portion of the study is to understand and apply the lessons learned from other studies, and not to create a comprehensive report on the general status of value pricing. Therefore, the information collected is being used to focus on the most relevant applications to facilities in the Dallas-Fort Worth Region so that the Project Review Committee can develop appropriate screening criteria to reach its short-term and long term goals. Some of the issues facing other agencies involved with value pricing have included:

- Travel Demand at different pricing levels
- Operational and infrastructure requirements
- Public and political acceptance
- Revenue and cost ratios
- Congestion levels
- Time savings benefits
- Safety benefits
- Technology
- Enforcement
- Emission levels and air quality
- Equity
- Relative changes in transit
- HOV and carpool usage
- Institutional or Industry inhibitors (such as bond covenants)
- Performance measures or measures of effectiveness
- Risk assessment.

Many of these issues will also be relevant to this study, and ultimately may be used to screen the freeway, tollway, and HOV corridors in the Dallas-Fort Worth Region to determine where value pricing applications may be appropriate, either as short-term pilot projects or for inclusion in the Metropolitan Transportation Plan. In addition, any future phases of planning or implementation of value pricing in the Dallas-Forth Worth region will be enhanced by the understanding of the successes (and challenges) of previous projects. To that end, contact information, including a project representative and an official website, have been included at the end of the descriptions of the ongoing projects so that members of the study team can contact agencies with questions that may arise after this study is completed.

2.1 HISTORY

In Clarkson Oglesby’s 3rd edition of Highway Engineering (1975) he wrote “…for a number of years, economists have proposed that more ‘economically efficient’ use could be made of highways … by imposing graduated user charges. These ‘efficiency tolls’ would be set at high levels during periods of high demand, so that only those willing to pay a high price would use the facilities. With volumes reduced, congestion and
resource consumption likewise would be reduced. Only on ‘congestion-free’ facilities would there be no charge at all.” Further, Oglesby states that “although road pricing would produce revenue for road improvement or other governmental uses, this is not its primary purpose; rather the income would be a desirable byproduct accompanying the main objective of more efficient road use. It can be argued that similar results might be obtained by subsidizing or even paying people to use mass transportation or to join car pools. The real world problem with this stratagem is that it would call for added spending by already financially pressed governmental agencies.”

In 1991, the U.S. Congress authorized the Congestion Pricing Pilot Program as part of the Intermodal Surface Transportation Efficiency Act (ISTEA) to encourage the testing and evaluation of value pricing concepts in a variety of locations nationwide. This program was designed to provide federal support to state and local governments or other public authorities to develop local road pricing programs; to plan, implement, monitor, and evaluate road pricing projects; and to study their effects. Due to the positive experience under the ISTEA legislation, this innovative program was reauthorized and expanded as the Value Pricing Pilot Program in the Transportation Equity Act for the 21st Century (TEA-21). The Federal Highway Administration (FHWA) and its project partners have now had over 14 years of experience with the pilot program, with dozens of projects currently funded, and nearly $30 million in federal funds provided to support these projects. The federal funding amounts have ranged from $150,000 to over $2,000,000 per project.

Established value pricing programs are currently operational in Orange County (SR-91) and San Diego (I-15), California; Houston, Texas (Katy Freeway and US 290); Lee County, Florida (the Leeway); Minnesota; and the Port Authority of New York and New Jersey. In addition, demonstration projects (projects that have been funded but have not begun, or have just begun operations) in California, Colorado, Florida, Georgia, Maryland, Massachusetts, New Jersey, North Carolina, Oregon, Pennsylvania, Texas, and Washington are now providing results from which the Dallas-Fort Worth Project Review Committee can learn valuable lessons.

In addition to projects in the United States, value pricing has been implemented, or at least considered, in a number of other countries. As early as 1975, for example, a peak-period charge for entry into a restricted downtown zone was instituted in Singapore. The fees, together with improved public transportation and bypass roads, have helped to control central area traffic over a long period of time. In 1998, Singapore introduced variable tolls on three principal motorways into the central area. Other locations with operational value pricing projects include Norway; the Netherlands; London; France; Germany; Seoul, South Korea; Hong Kong; and Toronto, Canada.

2.2 VALUE PRICING FACILITIES AND EXPERIENCE

Value pricing implementation strategies are developed according to the presence and type of facility that currently exists at that location. In general, value pricing projects fall into the following categories:

- Pricing HOV Lanes: Selling excess capacity on existing HOV facilities to create High-Occupancy/Toll (HOT) lanes
- Applying Value Pricing on Tollways: Implementing variable tolls (by time of day, vehicle classification, congestion level, etc.) on an existing toll facility or designing a new tollway with variable tolls
- Pricing Freeways: Adding new priced lanes to existing freeways or converting a freeway to a toll facility using value pricing.

Examining the common features of value pricing programs on these three types of facilities can give valuable insight into future projects.

2.2.1 State Route 91 (SR-91), Orange County, California

The State Route 91 (SR-91) Express Lanes opened in December 1995 as a buffer-separated toll facility in the median of a heavily congested 10-mile section of urban commuter freeway connecting the Riverside-Orange County line and the Newport-Costa Mesa Freeway (State Route 55). The SR-91 corridor is one of the most heavily traveled and congested routes in Orange County, California, carrying nearly 250,000 vehicles per day with typical reported peak period delays of 30-40 minutes.

The SR-91 project was funded totally by private sources through the California Private Transportation Company (CPTC) for approximately $126 million. The Express Lanes system is in operation at all times with tolls collected electronically using the FasTrakTM system at full highway speeds
value pricing history and experience

(see Figure 2-1). Toll collection is done entirely by electronic transponders that meet the California standard for seamless operation with electronic tolling systems statewide. The variable tolls range from $1.05 (off-peak) to $7.00 (highest-peak toll). In addition, there are several discount incentive plans offered to SR-91 customers. For example, for a $20/month fee, customers can belong to the “91 Express Club,” which offers a $1.00 discount on every trip.

The system is made up of four lanes, with two on either side of a median that divides the directions of travel (see Figure 2-2). The Express Lanes are physically separated from the same-direction general travel lanes by a painted buffer area and plastic pylons. The pylons are spaced so that vehicles cannot pass between them. To boost carpooling and to keep traffic moving on the new lanes, tolls are adjusted according to the time of day, and direction of travel, with a discount for HOV-3+ vehicles.

Throughout the project study and implementation stages, surveys were conducted to involve the public in the development of the Express Lanes system. Because the SR-91 Express Lanes provide a valuable opportunity to learn more about how travelers and travel conditions are affected by time-of-day road pricing, Caltrans and the FHWA Value Pricing Pilot Program have sponsored a multi-year monitoring and evaluation study by California Polytechnic State University, San Luis Obispo. The purpose of the study is to compile data such as traffic volume, speed and occupancy measurements, origin-destination and public opinion surveys, accident records, and ridership on parallel public transit lines. The initial study of the operation of the Express Lanes has yielded a number of important observations:

Figure 2-1: Electronic Toll Collection along SR-91 and Separation of Express Lanes from General Use Lanes

Figure 2-2: Free Flow Express Lanes Adjacent To Congested General Use Lanes on SR-91
• Traffic on the Express Lanes continued to increase steadily through the first years of operation. During this period of traffic growth, price changes were successful in maintaining peak-hour traffic free flow.

• Travelers do not necessarily use the Express Lanes on a consistent basis. Half the customers use the lanes once a week or less. The observed proportions of traffic using the Express Lanes closely mirror the amount of delay avoided.

• The socio-economic profile of Express Lanes users is quite similar to that of the other travelers on the corridor. While the frequency of Express Lanes use is somewhat correlated to income, 25 percent of the lowest income group identified in the study state they are frequent Express Lanes users. Female commuters are significantly more likely than male commuters to be frequent Express Lanes users.

• About 75 percent of the commuting public expressed approval of virtually all aspects of the Express Lanes after eighteen months of operation. However, approval of variable tolls and private sector involvement was initially lower, increasing after about a year of experience with the operation.

• Behavioral studies have confirmed that users value time savings very highly and are willing to pay high prices to avoid congestion.

The CPTC has emphasized that a key element to successfully building the facility was public input and customer use. The customers played an important part in the decision process and planners feel that this public involvement was a major reason for its successful implementation. In addition, marketing was, and continues to be, an important component in making the value pricing program successful. The CPTC, along with local businesses, offers a variety of discounts to encourage the use of Express Lanes. Some of the incentives offered are discounts on the purchase of gasoline and $1,000 in tolls offered by homebuilders with the purchase of a new home.

In January 2003, the Orange County Transportation Authority (OCTA) purchased the SR-91 Express Lanes from the CPTC. The facility was originally constructed with a non-compete agreement that limited additional parallel highway capacity to protect private investors. The purpose of the acquisition was to eliminate this non-compete agreement and allow capacity improvements in the SR-91 corridor that benefit motorists not using the toll lanes. The public acquisition of the Express Lanes will redirect toll revenues to general toll road operating expenses and debt repayment, ongoing maintenance to the lanes, and improvements in the SR-91 corridor.

2.2.2 Interstate 15 (I-15), San Diego, California

The Interstate 15 (I-15) corridor is an eight mile segment located in San Diego, California. It is considered one of the most congested corridors in the San Diego, California, area. HOV-2+ lanes were implemented in the corridor in 1988, but were underutilized through the early 1990’s. Volumes of fewer than 1,000 vehicles per hour per lane, indicating a level of service A (LOS A), were measured. The San Diego Association of Governments (SANDAG) board members developed a solution aimed at increasing the use of the under-utilized facility by allowing solo drivers to pay to use the facility. In 1992, SANDAG received a Federal Transit Administration (FTA) grant to design alternative value pricing strategies to more effectively utilize the excess capacity observed in the HOV lane system. In 1995, SANDAG received a FHWA grant to further study and implement the FasTrakTM High Occupancy Toll (HOT) Lane system (the same system used on SR-91). The main goals of the I-15 project included:

- Maximizing the use of the I-15 express HOV Lanes that already existed
- Determining if allowing solo drivers to use the express HOV lanes relieved congestion on the general lanes
- Improving air quality
- Funding HOV improvements and new transit improvements
- Developing a market-based approach to set tolls for the express HOT Lanes.

In operation since December 1996, the I-15 FasTrakTM project has been successful in meeting its primary goals of maximizing the use of the excess capacity on the I-15 HOV lanes. The program is comprised of two reversible lanes throughout an eight-mile segment of I-15. Concrete barriers located in the median separate these lanes from the general use travel lanes. Access to the lanes is available at only
the two endpoints (see Figure 2-3). During the morning peak period (5:45 a.m. to 9:15 a.m.), the lanes only operate in the southbound direction. In the afternoon peak period (3:00 p.m. to 7:00 p.m.), this system is reversed and only accommodates northbound trips.

The FasTrak™ system boasts the first dynamic toll collection system in the world (see Figure 2-4). Dynamic tolls are fees that vary by time and level of observed congestion based on real-time conditions. Under State legislation signed into law in 1994, single occupancy vehicles were offered use of the FasTrak™ system for a fee. Also included in this legislation was a requirement that the HOT lanes be priced to ensure they operate at the preexisting level of service (LOS) prior to the addition of single occupancy vehicles (LOS C).

Carpools of two occupants or more continue to use the system for free, while solo drivers who wish to use the HOT lanes can obtain a transponder for a $40 deposit. This allows them to pay a toll to use the facility by using a pre-paid FasTrak™ account. The prices can vary from $0.50 to $4.00 (and possibly up to $8.00 in very severe congestion), depending on the time of travel and level of congestion. To ensure acceptable levels of service, the prices can vary dynamically in as little as every six minutes. In addition, transit service along I-15 has improved, with the establishment of a new express bus route funded from revenues from the project that were used to start a new express bus system called the Inland Breeze.

In 2000, the average weekday traffic using the I-15 express lanes was 16,900 vehicles per day (VPD). Of this total, 3,900 were comprised of single-occupancy vehicles (SOV’s), with the remaining 13,000 split among carpools of two occupants or greater (HOV-2+). By 2002, total express lane volumes had increased to 4,700 SOV’s and 14,800 HOV-2+ each day, which represent increases of approximately 13% and 15%, respectively. The most recent data from SANDAG indicate that this growth trend has continued, with 5,200 SOV’s and 16,100 HOV-2+ using the express lanes each day during March 2003.

Customers view the I-15 pricing project as a success with very positive response to the dynamic pricing phase of the program by its users. Customer outreach was a crucial part of implementing the facility. The importance of the strong relationship between the project planning team and the citizens during the process was stressed throughout this project. Project team members relayed that a local influential political champion was also a major component to its success.

One of the positive program benefits has been the significant reduction in SOV violators on the I-15 HOV lanes, the result of increased California Highway Patrol (CHP) enforcement funded by the project. The HOV

Figure 2-3: HOT Lane Separated From General Use Lanes

Figure 2-4: Variable Information Sign Showing Dynamic Toll Amount
violation rate for California has a “first offense” fine of $271. In October 1996, illegal SOV’s comprised 17 percent of total vehicles on the HOV lanes. Throughout the ExpressPass and FasTrakTM program phases, violation rates have ranged between three and five percent of total traffic, whereas typical HOV lane violation rates throughout California range between five and ten percent.

The I-15 Value Pricing Project is generally considered a success, so much so that in September 2001, Governor Gray Davis signed SB 313, which eliminated the sunset date on the project. In addition, building on the success of the I-15 Value Pricing Project, the I-15 Managed Lanes project will create a 20-mile managed lane facility in the median of I-15 to the north of the existing I-15 Value Pricing Project. When completed, this new facility will include a four-lane HOV facility with a movable barrier, multiple access points throughout the facility to the regular highway lanes, and a high frequency Bus Rapid Transit system that will operate in the managed lanes. A study funded with a $950,000 FHWA grant is currently underway to examine the feasibility of conducting value pricing on these managed lanes. Extensive public outreach has indicated that equity was not considered a major obstacle to implementing pricing on the managed lanes and that the majority of those surveyed felt that pricing the lanes was fair for travelers on the main lanes.

2.2.3 Interstate 10 (I-10) and US 290, Houston, Texas

The I-10 (Katy Freeway) corridor is a 13-mile-long HOV segment located in Houston, Texas, connecting Washington Avenue to State Highway 6 and serving commuters traveling from Brazos River to Downtown Houston. Originally an HOV-2 facility, Houston Metro (METRO) and the Texas Department of Transportation (TxDOT) decided at that time to reduce congestion in the lane by restricting peak hour use to vehicles with three or more occupants (HOV-3). The change reduced the number of vehicles by more than half and restored speeds to free flow. In the mid-1990’s, METRO, TxDOT, and the Texas Transportation Institute (TTI) began a study of strategies for value pricing the segment of the Katy Freeway between Washington Avenue and State Highway 6. The main goals of the project were to improve traffic operations on the under-utilized HOV facility in the corridor. Local planners predicted that the proper capacity could be achieved somewhere between HOV-2 and HOV-3, so another method of optimizing the use of these lanes that would not load them to failure was needed.

METRO began value pricing on the Katy Freeway by allowing HOV-2 vehicles to buy into the HOV-3 lanes. Likewise, in mid-1999, the HOV lanes on US 290 (Northwest Freeway), just to the north of I-10, were given a 3+ carpool requirement, and this facility was approved for the QuickRide program. QuickRide was implemented on US 290 in November 1999.

The lanes operate in the morning between 5:00 a.m. and 11:00 a.m., and in the afternoon between 2:00 p.m. and 8:00 p.m. and QuickRide allows two-person carpools to pay to use the HOV lane during peak hours (6:45 a.m. - 8:00 a.m. and 5:00 p.m. - 6:00 p.m.) for a fee of $2.00. Other HOV’s with three or more occupants are still permitted to use the facility for free as they could before, and two-person carpools may use it without charge any time other than peak hours. SOV’s are not allowed on the Katy HOV lane at any time. To assure that travel conditions remain optimal for all HOV’s, the target maximum number of QuickRide vehicles was established at 600 during each peak hour.

The program started at a relatively low cost, in large part because existing resources could be utilized inexpensively. For example, enforcement is economical because METRO Police are already present at HOV exit locations. Also, no new toll collection equipment was needed in the field because transponder readers were already in place. Today, peak hour travelers on the HOV lane save an average of 18 minutes compared to travelers on the non-priced lanes.

Daily use by HOV-2 paying participants has been between 150 and 200 vehicles for both peak periods combined. The vast majority of enrollees are occasional users of QuickRide. About 25 percent of transponders are used in a given week, and about five percent of transponders are used five or more times per week. Revenues from QuickRide cover the nominal operating costs associated with maintaining and servicing participant accounts (approximately $100,000 per year excluding capital, marketing, and start-up costs paid from the value pricing funds, and enforcement and enrollment services otherwise in place as part of other METRO programs). Start-up costs in Houston were much less than they would have been had existing systems not been in place.
Even though the QuickRide Program has proved rather successful, there is still under utilization of the HOV lane during operating times. In 2000, TxDOT and METRO received FHWA funds and initiated a new study to look at improving the QuickRide program while increasing the utilization of the HOV lane and giving direction for the management of future priced or managed lanes. The usage of the QuickRide program has been relatively low, despite a time savings of about 20 minutes per trip. The study indicates that the limited use could be related to the low value users place on travel time savings, and the inconvenience of forming a two-person carpool. Still, over half of QuickRide trips seem to come from previous SOV trips, though surveys show that most of these drivers have had prior experience with the HOV lane and are most likely not new HOV lane users.

The evaluations of the QuickRide program show that improvements are needed in the areas of pricing schemes, lane use and toll collection enforcement, toll collection and tag reader technology, and public understanding of the roles and objectives of the QuickRide program. The study suggests that TxDOT and METRO may wish to experiment with lower fees to encourage higher usage. One of the greatest challenges for TxDOT and METRO was educating and communicating to the public and policymakers the benefits of value pricing, and the report suggests that additional marketing, personal interviews, and focus groups might be helpful to determine the causes contributing to low demand and usage of the program.

### 2.2.4 Leeway, Lee County, Florida

The LeeWay electronic toll collection system is made up of the Cape Coral and Midpoint Bridges, and the Sanibel Island Causeway/Bridge, in Lee County, Florida, and is operated by Lee County. Average weekday volume on the bridges varies between 60,000 and 65,000 vehicles. The primary goal of the value pricing project was to examine the effects of pricing on existing congestion, as well as install the technical infrastructure needed for future congestion management projects. The value pricing strategy was implemented in 1997 and included a variable toll rate for peak and “shoulder” peak periods. Because traffic congestion was not as severe during off-peak times, a reduced toll rate was implemented immediately during the shoulder peak times prior to and after the heaviest travel times. The shoulder periods, when there is a 50 percent discount on the peak period tolls, are from 6:30 a.m. to 7:00 a.m. and 9:00 a.m. to 11:00 a.m. and from 2:00 p.m.-4:00 p.m. and 6:30 p.m.-7:00 p.m.

Comparing pre- and post-value pricing implementation, data indicate that little change has occurred in the driving times of bridge travelers not eligible for variable pricing discounts. However, the travel pattern changes of patrons eligible for the variable pricing discount tolls reflect a significant shift of travel out of the peak on their bridges. Most half-hour time periods during discount hours experienced a significant increase in traffic, while traffic decreased significantly during peak periods. The data collected to date indicates that bridge travelers are responding to variable pricing as predicted, shifting their travel times from peak periods to discount (off-peak) shoulder periods. The data will be updated as the project continues and will be supplemented with telephone and travel survey data to determine why people altered their travel times and to examine the socio-economic characteristics of this group of bridge users.

As with other value pricing systems, Lee County officials have stressed the importance of gaining support from local politicians and the public. In addition, Lee County suggested that a system of collecting quality data and studying performance measures be established during the operation of the LeeWay program. These tools allow the research groups and the public to accurately measure the impacts and benefits of value pricing. Marketing of the LeeWay was and continues to be an important feature of its success. The LeeWay public outreach and education program focuses on informing customers that they are saving money instead of spending it.

Lee County is currently in the final phases of a new study to determine the feasibility and costs of constructing value priced queue jump facilities within the County. The LeeWay’s queue jumps would consist of elevated structures, similar to freeway entrance ramps, which would allow some traffic to bypass congested areas. The facilities would be equipped with electronic toll-collection, and tolls for use of the facility would vary by time of day or degree of congestion. Preliminary results from the study indicate the possibility that such queue jumps could pay for themselves over the twenty to thirty year lifespan of the structure.
2.2.5 Variable Tolls on the New Jersey Turnpike and River Crossings

The New Jersey Turnpike Authority operates a 148-mile, 28-interchange facility and is one of the most heavily congested roadway systems in the country, with average daily traffic exceeding 500,000 vehicles. The Turnpike charges tolls based on the length of travel, number of axles, vehicle type, and tare weight. With a FHWA grant of $477,000, the Turnpike Authority, in conjunction with the New Jersey Department of Transportation, is conducting a study to monitor the impacts of the Value Pricing Initiative that was implemented in October 2001. The research team is particularly interested in travel behavior changes resulting from value pricing.

Likewise, the Port Authority of New York and New Jersey (PANYNJ) oversees the maintenance and construction of several bridges and tunnels connecting New Jersey to New York. Several bridges and tunnels are priced for peak and off-peak periods by type of vehicle. In addition, commuters are given discounts for use of the EZPass on the George Washington Bridge, Lincoln Tunnel, Holland Tunnel, Goethals Bridge, Outerbridge Crossing, and Bayonne Bridge. As part of its initial study, funded with a $594,000 FHWA grant, PANYNJ emphasized the behavioral impacts of the value pricing initiative, monitoring the behavior of business and commercial vehicle operators, impacts on different socio-economic segments, media relations, and impacts to the traffic surrounding network. However, since the events of September 11, 2001, the demands on the PANYNJ facilities have changed. The project team continues to meet with focus groups made up of commercial vehicle and passenger car drivers to better understand how these drivers make transportation choices.

2.2.6 Value Pricing on Ten Corridors, Maryland

At the request of the Maryland General Assembly, Maryland’s Variable Pricing Feasibility Study was initiated in September 1999 through a $687,000 grant from the FHWA (plus $220,000 of matching state funds). The goals of Maryland’s study were to boost transportation efficiency and equity, expand travel choices, and reduce emissions. Maryland’s Variable Pricing Study included an investigation of value pricing strategies on ten transportation facilities in the Baltimore-Washington metropolitan area, including five highway (free) corridors and five toll facilities: I-270 from the Capital Beltway to Frederick County; I-495/I-95 (Maryland portion of the Capital Beltway); MD 210; US 50; I-95 (between the Baltimore and Washington beltways); the Fort McHenry Tunnel; the Baltimore Harbor Tunnel Thruway; the Francis Scott Key Bridge; the William Preston Lane, Jr. Memorial “Bay” Bridge; and I-95 between the Fort McHenry Tunnel and the Delaware State Line.

Phase I of the study included screening various strategies to determine which make the most sense in each corridor and which could be eliminated. Phase II included several technical studies, including travel demand modeling, pricing strategies, toll collection technology, enforcement, equity, legal issues, infrastructure requirements, and methods of lane separation. Maryland’s Study Team worked closely with a Stakeholder Committee and a Steering Committee to assess the interests of all road users in Maryland and guide the study. Through the 18-month study, several preliminary short-term (2-5 years) pilot projects and long-term recommendations were identified. A pilot program for converting the proposed HOV lanes on US 50 to HOT lanes was developed, but was ultimately removed from consideration when the Governor of Maryland determined that HOT lanes were not the appropriate solution for the US 50 corridor. The Governor’s decision to exclude new toll lanes as a method of reducing congestion and improving transit ridership in Maryland was based on the perceived inequity of linking an easier commute with a person’s ability to pay.

Some of the lessons learned from this initial value pricing experience included engaging the public early in the process and finding a political champion to promote the concept of value pricing on a particular facility. Other technical challenges encountered by the Maryland team included implementing toll collection on “free” highways, enforcement, and separation of HOT/HOV lanes from general use lanes on highways with closely spaced interchanges.

As of early 2004, several major highway projects and planning studies in Maryland have again formally incorporated HOT facilities in the planning process. Called Express Toll Lanes, new tolled lanes are being studied at some of the state’s most congested facilities including I-270 and I-495 (Capital Beltway) near Washington, D.C., and I-695 (Baltimore Beltway) and I-95 north of Baltimore. Since the lanes would be newly constructed instead of HOV lane conversions, it is likely
that all vehicles would pay a toll for access to these facilities.

2.2.7 Minneapolis, Minnesota

In March 1997, the Minnesota Department of Transportation (Mn/DOT) completed its study of region-wide, as well as specific facility focused value pricing applications in the Twin Cities of Minneapolis and St. Paul. Extensive modeling of impacts and innovative techniques to involve and educate the public were used to gather support for further study of pricing options. Planners utilized videos, meetings, and media outreach to maintain public awareness of the study. However, the public’s reaction to the study centered on notions that the present congestion levels were not critical enough to require immediate implementation and revenues should be spent on roadway improvements and maintenance. There were also concerns about diverting traffic to secondary roadways. Furthermore, a perceived lack of available alternatives raised concerns about adverse equity impacts. All of these concerns led to the consensus that regional value pricing was not yet a practical solution.

At the end of the study, recommendations included introduction of a HOT lane on the I-394 HOV facility spanning 13 miles. This plan to implement HOT lane congestion pricing in the Twin Cities was placed on hold, however, due to the perception of unfairness (“Lexus Lanes”) and resulting political concerns at the approaching election time in 1998.

A new attempt to incorporate value pricing in and around the Twin Cities Metropolitan area was begun in late 1999. The goals of this study were to manage current and future travel demand, reduce congestion, support smart growth initiatives, improve air quality and energy use, and provide a source of revenue. Various facilities, such as freeways, expressways, and other congested areas, were investigated for pricing options. A major focus of this study was public outreach and involvement. If variable pricing concepts were to be used on these facilities, SOV users would pay a toll, and HOV commuters would use the facility for free. The study proposed electronic toll collection for the facility to remove an unnecessary time delay in HOV lanes for the SOV users. Equipment would be placed on each customer’s car and gantries would be set up every half-mile.

After extensive study, researchers discovered that focus groups and special meetings of impacted groups must be an integral part of the planning process. Public input and acceptance are crucial for implementing a value pricing strategy. The study group also discovered that equity issues needed to be addressed in the early stages of the project to prevent questions that might arise later and cause problems for project implementation. Mn/DOT must also indicate to the public how the revenues collected from HOT lanes would be used. Improvements to transit have been deemed by the public to be a reasonable use of toll revenues, particularly if transit could be used to provide a reasonable travel alternative in that corridor. Other public concerns, such as the impact of traffic diversion on parallel arterial and collector roads, would also need to be addressed.

There controversy over whether the new HOV lanes should be converted to HOT lanes or opened to all users for a fee continued. One reason for the lack of public support was the unfamiliarity with the concept of road pricing and its benefits because there are no toll roads in the metro area. Based on their experience, the Mn/DOT project team believes that a political champion is essential to the development and implementation of a value pricing project. The lack of support from a local political figure can make it difficult to gain public support.

In April 2003, the Governor and Lieutenant Governor of Minnesota announced their support of user fee financed lanes to address transportation capacity concerns in key interstate and state highway corridors. This plan was based on a federal proposal that would permit the collection of user fees to finance interstate highway expansion to reduce traffic congestion. The Minnesota Legislature passed high-occupancy toll legislation during the 2003 legislative session, authorizing Mn/DOT to charge fees to single-occupant vehicles for the use of HOV lanes. In November 2003, the Governor and Lieutenant Governor approved a plan to convert the existing HOV lanes on I-394, in the western suburbs of Minneapolis-St. Paul, to HOT lanes. Speeds at or near the posted speed limit would be maintained by varying the toll charged to SOVs according to use and demand of the HOT lanes, which would use variable message signs to notify drivers of the current toll and use the MnPass ETC system to collect tolls. After ten years of research, education, outreach, and several unsuccessful attempts to implement a value pricing pilot project, Minnesota opened its first HOT lanes on I-394 in May 2005. The prices are dynamically set as often as every three minutes, ranging from $0.50 to $4.50, to keep traffic...
flowing in the MnPass lanes. Initial reports suggest that the I-395 MnPass lanes are working well.

### 2.2.8 London

Greater London, with seven million people and nearly four million jobs, has been the site of a series of comprehensive studies of congestion pricing over the last 30 years. None of the studies have been implemented. During the 1970’s, the Greater London Council became interested in restraining traffic through a form of “supplementary licensing” in which a daily license would be required within a defined area during the high use hours of the day. The favored options all involved a daily fee of around $2.00 (U.S.) to drive in Central London between 8:00 a.m. and 6:00 p.m. on weekdays. When the Greater London Council was abolished in 1985, this plan lost its principal proponent. In 1994, a plan to draw a cordon line around central London was proposed. It would have 133 toll locations and use transponders to collect the fees. The scheme was predicted to achieve substantial traffic reductions for Central London, but the implementation of the system was considered too expensive. At the conclusion of the study, the Minister of Transport declared that no congestion pricing would be undertaken in London at least for the remainder of the decade. However, results of the study were being considered for applicability to other British metropolitan areas such as Bristol.

In February 2003, the City of London began its Congestion Charging program, a cordon pricing strategy charging drivers to enter the most congested eight square-mile section of central London. Overall congestion in London had continued to increase, with over 250,000 vehicles within the cordon zone on a typical working day, with average speeds dropping below 10 miles per hour. Six weeks into the pricing program, approximately 20% less traffic entered the zone during a typical workday. Motorists who enter an eight square mile area of central London between 7am and 6:30pm will pay a daily fee of £5 (about $9.00). It is expected that the congestion pricing program will reduce traffic in the area by 20 to 30 percent, encouraging people to take transit, bike or walk. In addition, the program is expected to raise over $200 million a year, which will be invested in the city’s public transportation system.

The London Congestion Charging program uses 203 enforcement cameras both on the boundary of the charging zone and at various locations within it. Drivers prepay the entrance charge, and the cameras read the vehicle identification number and automatically identify whether the charge has been paid. Fines are issued to those who have not prepaid. Certain vehicles are exempted from the charge, including taxis, emergency services, and alternative energy vehicles. Residents of central London within the cordon receive a discount.

In May 2005, a public survey was initiated to obtain feedback on a proposal for a Western Extension of the Central London Congestion Charging Scheme. The extension is anticipated to further reduce congestion, accidents, emissions and fuel consumption, and raise revenues to be used for additional transportation improvements.

### 2.3 LESSONS LEARNED

Overall, a number of important lessons can be learned from the wealth of value pricing studies and operational projects. For example, many studies have shown that road users highly value time savings and are willing to pay a price during the peak period to avoid congestion and delay. Further, value pricing can reduce congestion by shifting demand to off-peak periods or other facilities. Value pricing can be fair and equitable, because adverse impacts can be addressed and mitigated with strong public involvement and a comprehensive public participation program. In addition, nurturing of supporting constituencies are critical factors in acceptance. Initially the public may be concerned that variable pricing may be inequitable, but these concerns can be addressed using the revenues obtained from pricing. Many specific lessons, which are applicable to the Regional Value Pricing Corridor Evaluation and Feasibility Study in the Dallas-Fort Worth Region, are summarized below:

#### 2.3.1 Establish Goals of Value Pricing Project

Many of the studies and projects had similar goals. Many developed screening criteria based on those goals as well as previous studies of value pricing. Some of these goals include:
• Study the potential for value pricing strategies in alleviating congestion in a corridor
• Evaluate the potential of pricing strategies to facilitate the timely, efficient and economical movement of commercial vehicles to industrial and commercial destinations
• Improve the movement of daily commuter vehicles to and from the workplace
• Develop and implement a public process for building community acceptance of market based demand management techniques
• Maximize the use of HOV Lanes that already exist
• Determine if allowing solo drivers to use the express HOV lanes relieved congestion on the general lanes
• Improve air quality
• Develop a market-based approach to set tolls for the express HOT Lanes.

2.3.2 Screening Criteria

Several studies began with defining a set of evaluation criteria, which could be used to both screen toll lane concepts for further evaluation and develop more detailed concepts. Examples of evaluation criteria have included:

• Congestion and travel time savings for new and existing lanes
• Compatibility with federal/state highway design standards
• Capital and operating costs
• Enforceability of toll and HOV requirements
• Tolling feasibility and effectiveness
• Operational impacts on freeway and local streets
• Potential environmental impacts
• Equity
• Ability to finance

2.3.3 Public Outreach and Political Support

Researchers in several studies discovered that focus groups and special meetings of impacted groups must be an integral part of the planning process. Many agencies, such as TxDOT and METRO, have said that one of the greatest challenges was educating and communicating to the public and policymakers the benefits of value pricing. Public input and acceptance are crucial for implementing a value pricing strategy. Based on this lesson, many subsequent studies have included engaging the public early in the process and finding a political champion to promote the concept of value pricing on a particular facility. For example, Lee County officials have stressed the importance of gaining support from local politicians and the public. Collecting quality data and studying performance measures allowed the research groups and the public to accurately measure the impacts and benefits of value pricing. The LeeWay public outreach and education program focuses on informing customers that they are saving money instead of spending it. Many projects, such as the Florida Turnpike study used public involvement, including educational and outreach components (newsletters and project web site), as well as workshops with stakeholders and focus groups were an ongoing process throughout the study.

Presenting the results of successful operational projects can also be a useful tool in a public outreach effort. For example, for SR-91, nearly 75 percent of the commuting public expressed approval of virtually all aspects of the Express Lanes after eighteen months of operation. However, approval of variable tolls and private sector involvement was initially lower, increasing after about a year of experience with the operation. Behavioral studies have confirmed that users value time savings very highly and are willing to pay high prices to avoid congestion.

Based on experiences in Minnesota and Maryland, it has been shown that a political champion is essential to the development and implementation...
of a value pricing project. The lack of support from a local political figure can make it difficult to gain public support. As another example, the San Francisco-Oakland Bay Bridge study, which did not result in implementation of a demonstration project, showed that lack of public and political support and understanding can be detrimental to a project.

2.3.4 Equity

Many studies have failed to result in implementation of an operational project due to concerns about equity. For example, Maryland’s US 50 HOT lane pilot program was removed from consideration due to the perceived inequity of linking an easier commute with a person’s ability to pay. Likewise, in Minnesota, recommendations for a HOT lane on the Interstate 394 HOV facility spanning 13 miles was placed on hold due to the perception of unfairness (“Lexus Lanes”) and political concerns.

However, the SR-91 project has proven that value pricing does not impact equity. The socio-economic profile of SR-91 Express Lanes users was found to be similar to that of the other travelers on the corridor. While the frequency of Express Lanes use is somewhat correlated to income, 25 percent of the lowest income group identified in the study state they are frequent Express Lanes users. Female commuters are significantly more likely than male commuters to be frequent Express Lanes users.

However, the lesson for other agencies is that equity issues need to be addressed in the early stages of a project to prevent questions that might arise later and cause problems for project implementation.

2.3.5 Enforcement

Enforcement of priced lanes is another challenge facing many agencies, particularly those that implement managed lanes adjacent to general purpose lanes. The issue of enforcement is even more critical with priced lanes, as the lack of enforcement results in the loss of revenue and the degradation of the value pricing program. One successful example is the significant reduction of SOV violators on the I-15 HOV lanes, which has been the result of increased California Highway Patrol (CHP) enforcement funded by the project. Throughout the I-15 program, violation rates of SOV’s have been reduced from 17 percent of total vehicles on the HOV lanes to between three and five percent of total traffic, whereas typical HOV lane violation rates throughout California range between five and ten percent.

In other locations, such as Maryland and Alameda County, California, highway patrol representatives had serious concerns about enforcing the vehicles in a HOT lane because neither electronic toll collection nor physical lane separation was deemed to be feasible in the corridor under study. Patrol officers would have to rely to visual identification only, which would not be effective nor a desirable use of resources.

2.3.6 Tolling Technology

On facilities where tolling is not currently in use, agencies face challenges associated with implementing toll collection that is accurate, efficient, and economical. The 407 Express Toll Route is one example of a fully automated electronic toll collection that can be implemented on a highway system in North America that also reduced congestion. Many projects have shown that variable tolls can generate large revenues and that technology is available for collecting tolls at highway speeds, and that video technology can be used successfully to identify users without transponders, which enables invoicing owners of the vehicles for the tolls. In cases where tolls already exist, such as in Houston, no new toll collection equipment was needed in the field because transponder readers were already in place. Further, one may wish to consider following California’s example by defining a statewide standard for tolling technology to create a seamless toll collection system.

2.3.7 Use of Revenues

Using revenues from value pricing studies to benefit other means of public transportation is an important benefit of value pricing. For example, transit service along I-15 has improved, with the establishment of a new express bus route funded from revenues from the project that were used to start a new express bus system called the Inland Breeze. In 2003, London implemented its new Congestion Charging program to relieve a portion of the traffic congestion within the central city district with plans of investing the forecast revenues of $200 million (U.S.) annually to improve the city’s public transportation system. Additional public uses include paying for facility operation, maintenance, and enforcement. While these are potential examples that have already been tried, thinking “outside the box” may eventually lead to even more efficient uses of the potential revenue windfall of transportation pricing.